

THE TRANSDUODENAL ROUTE (DUODENO-
CHOLEDOCHOTOMY) IN CASES OF IMPAC-
TION OF GALL-STONES IN THE LOWER
PORTION OF THE COMMON DUCT.

WITH REPORT OF A CASE OF CHOLEDOCHOTOMIA TRANSDUO-
DENALIS WITH CHOLEDOCHODUODENOSTOMIA INTERNA.

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SINCE McBurney's¹ ingenious idea and advocacy, in 1891, of the removal of gall-stones impacted near the papilla by dilatation and incision into the papilla after opening of the duodenum, this operation, called by Pantaloni, *Lithectomie Choledochienne per Voie Duodenale*, has been already performed up to 1899 twenty times, with two deaths, as cited by Kocher.²

In some of these cases an incision into the papilla, as advised by McBurney, was unnecessary, and the impacted stone could be removed by simple dilatation of the papilla by forceps (Collins's method). It is natural that in cases where, after opening of the duodenum, the stone is found lying near the papilla, or in the interparietal part of the duodenum in the neighborhood of the papilla, the method cited above is the method *par excellence*. But in other cases where the stone is impacted and lies immovable a little higher up in the retro-duodenal portion of the common duct, and access by supraduodenal choledochotomy is inadvisable because of tense adhesions or other circumstances, to which I will recur later on, in such case one has, after opening the duodenum, to incise the posterior wall of the duodenum and the common duct on that place which appears to be the nearest for reaching the stone without

previous search for the papilla. This method — claimed by Kocher as being first performed by him in 1894, and later on successfully by Kehr and Mayo Robson with good results—is called by Pantaloni—to whom we owe an excellent description of the various methods of operations performed on the bile passages by way of the duodenum—choledochotomy transduodenale.

As the question of advisability of duodenocholedochotomy has not yet been settled as to universal agreement, the contribution of a case operated by the author seems worthy of consideration, and may form another link in the chain on which to base future definite conclusions.

About the 3d of February, 1902, I was called into consultation by Dr. S., Fredonia Station, Wisconsin, to see a lady fifty-three years of age, who had been complaining for about five to six years of severe attacks of pain in her epigastric region. Twelve months before a sudden attack of pain had set in which was so violent that she fainted. From that time, that is for twelve months, she had been intensely jaundiced, her bowel movements looked gray and smelled stronger than before, and she lost 102 pounds in weight during the year. From the sudden onset of the jaundice, and as no swelling of the gall-bladder was perceivable during examination, I made the diagnosis of complete obstruction of the common duct by gall-stones, which had already lasted for twelve months.

After eight days' preparation in my hospital, during which time I administered six grammes of chloride of calcium daily, and gelatin solution into the rectum (10 to 100) each day for three days previous to the operation, to avoid hæmorrhage during and after operation, I operated on the 18th of February, kindly assisted by Drs. O'Brien, Boden, and John; narcosis, Dr. Sickles.

A large bag was put under the liver of the patient, and then the abdomen opened by a longitudinal incision on the outer border of the rectus muscle. After freeing some adhesions with the omentum, the gall-bladder and a part of the cystic duct were found transformed into a rocky-like mass of the size of two thumbs, the gall-bladder containing not a drop of fluid. After a large incision into the thickened wall of the gall-bladder, this

mass, which appeared to consist of numerous gall-stones welded together, was dug out, and a gauze sponge put into the bladder to avoid oozing into the abdominal cavity during operation. Then a transverse incision through the rectus muscle and the suspensory ligament of the liver was made to gain better access to the region of the common duct. Putting one finger into the foramen of Winslow, and the thumb of the same hand above the common duct, the choledochus was explored. Three concretions were found movable in this duct, and besides that, a hard mass of the size of a hazel-nut was encountered behind the duodenum in the retroduodenal portion of the duct. As several manipulations to dislodge this concretion into the supraduodenal portion of the common duct proved futile, the duodenum was incised by a longitudinal incision on the anterior wall. Then, as I could not find the papilla immediately, an incision was made through the posterior wall of the duodenum and choledochus to this immovable concretion, after having brought the movable stones downward to the impacted stone, holding them tightly in this position by the index-finger of the left hand introduced into the foramen of Winslow, and the thumb of the same hand pressing the upper portion of the common duct.

With some difficulty the incarcerated stone was dug out of its diverticulum; the other stones were easily stripped into the duodenum, the duodenum and choledochus sutured together with four silk sutures (choledochoduodenostomia interna), and then the duodenum on the anterior wall closed in the usual manner. The gall-bladder was drained with a drainage tube after Poppert's method, and a strip of iodoform gauze put around this tube and down to the suture of the duodenum. The patient made an uneventful recovery; her pulse and temperature were never over 100; the fistula from the gall-bladder closed by itself five weeks after the operation. She left the hospital six weeks after operation, her weight increasing rapidly (thirty-seven pounds in four and one-half months).

When I cited this case briefly at the last meeting of the American Medical Association, in a discussion following the papers of Tinker, Baltimore, and Fergusson, Chicago, Dr. Ransohoff, Cincinnati, remarked that the transduodenal route had to be discarded because of the danger of post-operative infec-

tion. Unfortunately, he did not cite on what experience of his own this wholesale rejection was based. The opinion that the death-rate after duodenal choledochotomy would be larger because of the danger of sepsis than after supraduodenal choledochotomy, seems to me to have spread in consequence of the paper of Mayo Robson in *The Lancet*,³ who expresses himself thus: "Reaching the common duct through the open duodenum, a modification of choledochotomy seemed to me, when it was first suggested by McBurney, an easy and ideal operation, and at that time it was easier than ordinary choledochotomy; but I feel sure that there is a greater danger of sepsis by this method, owing to the necessary enterotomy; and since I have adopted my modification of choledochotomy I have not repeated the operation through the duodenum, and I am quite clear that it is not only more difficult and more dangerous, but that it does not afford so great a facility in clearing the whole of the ducts of concretions. I have performed it eleven times with three fatalities, which compares unfavorably with the ordinary choledochotomy."

In my introduction I have already cited one statistic of duodenal choledochotomies collected up to 1899, as cited by Kocher,—twenty cases with two deaths. Tinker cited at the last meeting of the American Medical Association two cases; Mayo in Rochester,⁴ one case; and Robinson⁵ two cases without mortality. By private information at the last meeting of the American Medical Association, I was kindly informed by J. B. Murphy that he used the method once, and A. H. Fergusson twice, without fatality. This would make, including the case cited by myself, twenty-nine cases with two deaths, which equals a little less than 7 per cent. In other words, this percentage is not far from that given by Mayo Robson as future possible reduction of mortality when choledochotomy is performed with due precautions after his method, that is, 5 per cent. (*vide The Lancet*, April 12, 1902).

It must be stated, however, for comparison, that before 1900 his death-rate in choledochotomy was 23.8 per cent., and in those operated after January 1, 1900, 7.1 per cent. Fenger

collected in 1896 forty-four cases of choledochotomy, with a mortality of 18 per cent., as cited by Haggard.⁶ Petersen⁷ cited at the Surgical Congress in Berlin, 1898,—from Czerny's Clinic,—twenty choledochotomies with four deaths, that is, 20 per cent.; and Haasler,⁸ from von Bramann's Clinic, under seventy gall-stone operations, eighteen operations on the common duct with two deaths.

I am certainly not convinced of the truth of the words of Talleyrand: "*Messieurs, la statistique c'est le mensonge en chiffres.*" I am of the opinion that these small figures, as given above by Mayo Robson against the advisability of duodenal choledochotomy, and by me in favor of it in suitable cases, do not prove much, if anything, pro or contra, and are too small for forming definite conclusions. But so much I think must be admitted, that the fatalities in duodenocholedochotomy, as shown by my statistics, are by no means higher than those given in the statistics of ordinary choledochotomy. (Unfortunately, I have not the library at hand from which to collect all the cases from the world's literature, therefore it must be excused if my collection is incomplete, and my statistic may be taken *cum grano salis.*)

With full justification, Riedel⁹ has pointed out that those cases, where severe infection of the bile passages has taken place *before operation*, are the cases of mortality by sepsis after operation. These people die whether or not one resorts to transduodenal choledochotomy or supraduodenal choledochotomy, or other methods. The most experienced surgeon is, under such conditions, absolutely at the mercy of the virulence of the bacteria and toxins, no matter how brilliant his technique may be. When we compare the statistics of choledochotomy of recent date with the statistics given in former years, we will find that in general more or less decrease of mortality is perceivable. This must be attributed to, first, the development of technique and advanced knowledge of the pathological conditions present; second, to the care and preparation of the patient before operation (chloride of calcium and gelatin solution in cases of jaundice), during operation (large sand bag under the

liver without or together with a position which reminds me somewhat of Walcher's position for contracted pelvis), and after operation; third, to the advanced experience of surgeons in this line of work; and last, but not least, to the employment of drainage in gall-stone surgery, as pointed out by Fenger,¹⁰ Quénu,¹¹ and Fergusson. The latter surgeon collected ninety-five cases of suture of the duct with a mortality of 35.5 per cent., while the mortality in cases without suture was only 18 per cent. (*vide* Haggard¹²). This by the way.

That it is oftentimes extremely difficult and not seldom dangerous to remove stones impacted in the retroduodenal portion of the common duct from those places where they are usually found, that is, near the opening of the papilla, or before the diverticulum of Vater, or before the pancreatic portion of the common duct, by supraduodenal choledochotomy, is best illustrated by two cases cited by Mayo of Rochester¹³ in his recent article in the ANNALS OF SURGERY: "Analysis of 328 Operations upon the Gall-Bladder and Bile Passages." He cites that in two cases energetic attempts to remove all stones from the lower end of the duct, or a diverticulum from it, resulted in forcing the finger well into the duodenum, probably at an adjacent point rather than at the site of the papilla. One of these patients died later on from the consequences, which produced a duodenal fistula. There is no question that by working in the dark from the supraduodenal incision down to the duodenum with scoops, forceps, and sounds, severe damage may be inflicted upon the tissues of the common duct, pancreas, and duodenum, chiefly when ulcers are present, produced by the long-continued pressure of the stone, and that thereby sources for future infection are opened. Furthermore, fragments of stone can be left, thereby paving the way for future recurrence of the obstruction; and a cancer near the papilla, if in its initial stage, could never be detected by this route.

Even if one is enabled to pass a sound down into the duodenum, as advised by Robson, it is thereby not always demonstrated whether the sound passes through the papilla or has perforated the duodenum at another spot.

Fergusson advised, at the last meeting of the American Medical Association, a method of pumping air through the retroduodenal portion of the common duct into the duodenum, to prove the permeability of the papilla. This method is open somewhat to the same objections; and, besides, air can often-times pass by the stone.

One has pointed out that it would be difficult to clean out from the duodenum all the stones in the common duct when lying in the supraduodenal portion or in the hepatic duct. The following considerations speak somewhat against it: When a stone is impacted in the retroduodenal portion of the common duct, and more or less complete obstruction has taken place for some time, the common duct usually becomes dilated; and if there are other stones lying higher up, they are generally movable, and can, after removal of the impacted stone, be easily stripped down into the duodenum by putting two fingers of the left hand into the foramen of Winslow, and the thumb above the duct, as urged by Deaver¹⁴ and others. In my case I found it very easy to remove the three stones lying behind the incarcerated concretion, because I had already, before incising the duodenum, stripped them down to the impacted stone, and held them tightly in this position to avoid their slipping back after opening and collapse of the duct. I think this procedure advisable.

At the German Surgical Congress in 1898, Haasler¹⁵ cited another method of removing stones from the retroduodenal portion of the common duct, which he calls retroduodenal choledochotomy, and used three times in eighteen cases of stones in the choledochus. This operation is performed in the following manner: "Longitudinal incision into the anterior layer of the ligamentum hepatoduodenale, near and parallel to the duodenum. Care must be taken to avoid by the incision a branch of the arteria pancreaticoduodenalis running in this direction. By blunt dissection the duodenum can now be severed for a distance of from two to three centimetres and retracted to the left side, whereby the retroduodenal portion of the common duct, covered more or less by the pancreas, is brought into

view. Vautrin proposed to divide the pancreatic tissue by the thermocautery, but this method was not followed in von Brann's Clinic. In one case they incised the pancreas with the knife, and in the two others the lobes of the glands were severed by blunt dissection at that place where they form a ring around the anterior wall of the duct. Thus the common duct was brought into view and incised.

"For cases of stone impacted in the papillary portion of the duct, he thinks intraduodenal operation the best method, if it is not possible to dislodge the stone and press it into the duodenum. He succeeded twice in doing this, and once intraduodenal operation was necessary, the stone pressing the papilla far into the duodenum, so that it made the impression of a polypus body. Recovery took place in all three cases."

It seems to me that this retroduodenal choledochotomy is more difficult than the transduodenal operation; and beside that, incisions through the pancreatic tissue might be followed by pancreatitis and necrosis.

It is true that cases where stones are absolutely impacted in the retroduodenal portion are not very numerous, and in every case it must be tried first to dislodge the stone up to the supraduodenal portion. This will always be found possible in cases of so-called ball-valve stone of Fenger; and Kehr¹⁶ cites that in most of his cases the incision into the retroduodenal portion of the common duct was made unnecessary by the bimanual manipulations which brought the stone up so that it could be removed through the supraduodenal portion. In one of his later topics, entitled, "Die Resultate von 360 Gallenstein Laparotomieen unter besonderer Berücksichtigung der in den letzten zwei Jahren ausgeführten 151 Operationen" (*vide* above), he expresses himself thus: "Chiefly the stones impacted in the duodenum, or even in the papilla, are difficult to remove. A certain manipulation I have found very valuable: With the left hand in the abdomen, the left index-finger is introduced into the open choledochus fixed by sutures, while the right hand presses the abdominal wall against the left hand, thereby using bimanual influence on the stone, by which it may be loosened

and removed from the common duct. I can heartily recommend this manipulation. When the common duct is not large enough to admit of the introduction of the finger, transverse incision into the duodenum is indicated."

To what results these manipulations with the finger and instruments may sometimes lead in cases where the tissues are friable, I have already illustrated by the two cases mentioned by Mayo of Rochester. In my case I am of the opinion that all of these manipulations would have been futile, and much time would have been lost unnecessarily, as the impaction was so firm that, even after a large incision through the posterior wall of the duodenum, it was extremely difficult to dig it out of its diverticulum without rupturing adjacent tissues.

That in cases where the impaction of the stone is not near the papilla, or the papilla cannot be found immediately, incision through the posterior wall of the duodenum and to the impacted stones in the common duct is the proper method of operation, I have already touched upon in my introduction. It is advisable in such cases to suture that part of the common duct which has been incised to the duodenum (*choledochoduodenostomia interna*), as this will prevent infection of that place which is lying between the duct and the duodenum.

This is not the place to go into further details of the preparation of patients, jaundiced for a longer period of time, before operation. In all such cases it is advisable to administer, according to Robson, chloride of calcium with or without gelatin, of which the active agent has been shown to be the lime, to prevent hæmorrhage during and after the operation. For this same reason I did not extirpate the gall-bladder, but in my case resorted to drainage of the bladder after a method known as Poppert's¹⁷ method, which, however, was already practised beforehand by Longyear and Hall, of Cincinnati, in 1893, according to Haggard.¹⁸

In closing, I may be allowed to draw the following conclusions:

First, the transduodenal route has a well-defined place in the surgery of obstruction of the common duct produced by gall-stones;

Second, lithotomia transduodenalis, first advocated and practised by McBurney in 1891, either after his methods, that is, with incision of the papilla, or Collins's method, that is, dilatation of the papilla, is the method *par excellence* for all cases of gall-stones impacted at or near the opening of the papilla, as soon as experiments of manipulation, to press the stone into the duodenum by bimanual manipulations, have proved unsuccessful;

Third, choledochotomia transduodenalis is indicated for stones impacted in the retroduodenal portion of the common duct, or before the diverticulum of Vater, as soon as efforts to dislodge the stone up into the supraduodenal portion have proved futile;

Fourth, in all cases where choledochotomia transduodenalis has been performed, it is advisable to suture the common duct to the duodenum to avoid infection (choledochoduodenostomia interna);

Fifth, choledochotomia transduodenalis seems to be more advisable than choledochotomia retroduodenalis because it can be more easily performed, and the integrity of the pancreas is not interfered with;

Sixth, it has not been proven by statistics that transduodenal choledochotomy has a greater percentage of fatalities produced by septic infection than supraduodenal choledochotomy. Further contributions in this direction are desirable for the purpose of procuring definite conclusions. Most of the cases where sepsis was the cause of the death of the patient after an operation on the common duct, were cases of infection of the bile passages before operation, and the method of operation was not responsible for the fatal result.

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⁹ Ibidem, p. 155.

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